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10/529,857	11/17/2005	Lars Henrik Gjertsen	TANDBERGS5	5344

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EXAMINER	
WU, IVES J	

ART UNIT	PAPER NUMBER
1797	

NOTIFICATION DATE	DELIVERY MODE
09/22/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ddalecki@wenderoth.com
eoa@wenderoth.com

Office Action Summary	Application No.	Applicant(s)	
	10/529,857	GJERTSEN ET AL.	
	Examiner	Art Unit	
	IVES WU	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18* is/are allowed.

6)☒ Claim(s) *2,5-7,9-14,17,19* is/are rejected.

7)☒ Claim(s) *3,4,8,15 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

(1). Applicants' Amendments and Remarks filed on 8/17/2010 have been received and acknowledged.

Claims 1 was cancelled before.

Claims 2-3, 11-12 are amended.

The 112 1st rejections of claims 2-16 in prior Office Action dated 5/19/2010 is withdrawn in view of the present Amendments.

The rejections of claims 11-12, 4 and 6 in prior Office Action dated 5/19/2010 is withdrawn in view of present Remarks.

The indicated allowability of claims 17-19 is withdrawn in view of the newly discovered reference(s) to Baker et al (US 5632962A). Rejections based on the newly cited reference(s) follow.

A new ground of rejections for claims 2-19 is introduced in the following.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(2). **Claims 11-12** are rejected under 35 U.S.C. 102(b) as being anticipated by Greene et al (US 6019825A).

As to a standing vessel having a substantially round cross section, an inner wall, a lower liquid outlet and an upper gas outlet in a scrubber for separating constituents including a liquid phase from a substantially gaseous fluid flow in **independent claim 11**, Greene et al (US 6019825A) disclose a hydrocyclone gas separator (Title). The input stream may consist of any combination of phases, such as solid/liquid, liquid/gas, or all three phases (Col. 3, line 55-57). While the hydrocyclone embodiments described in this application are oriented in the preferred vertical direction, horizontal orientation is also possible (Col. 2, line 64-67). It is well known in the art that cyclone has round cross section. As further illustrated in the Drawing below, outer

vessel 20 cylindrical transition section 4, outer shell 12 (standing vessel), inner core 10 (standing vessel), conical annular space 14, the inner wall and 22a for the heavy fraction (liquid if input stream is gas/liquid) and outlet 24 (Col. 4, line 54-56).The light fraction (e.g. gas and/or liquid) is drawn upward through center area 26 toward outlet 28 (Col. 4, line 58-60).

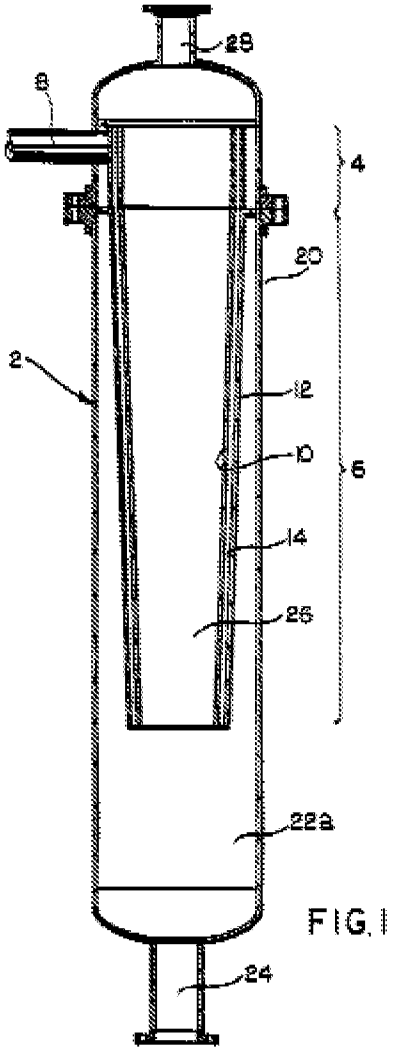
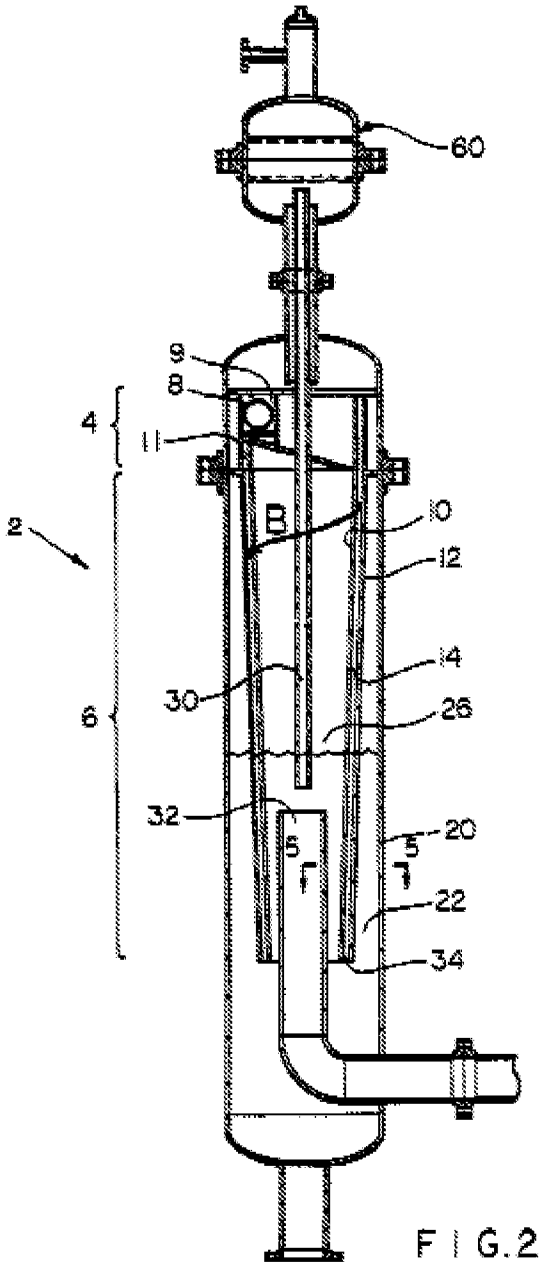


FIG. 1

As to a fluid inlet directing fluid introduced into the standing vessel along the inner wall in a scrubber in **independent claim 11**, and fluid inlet being oriented so as to be tangential to the inner wall of the scrubber in **claim 12**, Greene et al (US 6019825A) disclose a mixed phase stream entering the cyclone under very high velocity through inlet 8 into transition nozzle 9. The inlet nozzle 9 protrudes inside the body of the transition section 4, situated horizontally and

tangentially with respect to the inside wall 13 (Fig, 3, 12 outer shell in Fig. 1 above) of the transition section (Col. 4, line 28-35).

As to a fluid way to be arranged as a downward directed spiral along the inner wall of the standing vessel, that extends from the vicinity of the fluid inlet to the vicinity of the liquid outlet, that has an opening allowing gas to escape inward to a central region of the standing vessel, such that all fluid introduced into the fluid way is passed down the full length of the fluid way, except the escaped gas in a scrubber in **independent claim 11**, Greene et al (US 6019825A) disclose Figure 2, the helical path B reads the features as claimed.



F I G. 2

Greene et al (US 6019825A) disclose, the helical path, beginning as the nozzle 9 transitions into the rectangular cross-section space 11, winds into the cyclone section 6 and begins its descend downward under centrifugal force. Because of the extreme force exerted on the stream by virtue of tightly wound helical path, the mixture is separated into its three phases based on density. The heavier fraction is forced radially to the outside of the annular space against the inside wall of outer shell 12. The light fraction (e.g. gas and/or liquid) is drawn

upward through center area 26 towards outlet 28. Another embodiment which may be used alone or in conjunction with other embodiments described is shown in details in Figs. 5 & 5A. The embodiment comprises passage means located in the walls of either or both of the inner and outer shell to provide fluid communication with adjacent region and can be used to enhance the separation of different phases. In the case of the inner shell, the inner shell passage 39 in the form of ports, vanes or perforations which communicate the annular space with the interior region 26, act to draw off the lighter fraction, e.g. gas or entrained liquid from the helical flow into the region 26 for removal through uptake 28, the passage means 39 should be located below the uptake 28. Likewise, the outer shell may have outer shell passage means 41 which communicate the annular space with the annular outer shell 12 and which act to draw off the heavier fraction, e.g. mixed solid and liquid. If either or both of the inner shell passage means or outer shell passage means are present, the remaining, medium weight fraction e.g. consisting mostly of liquid will continue to flow down the helical path for exit at bottom (col. 4, ln.47 – col. 5, ln. 17).

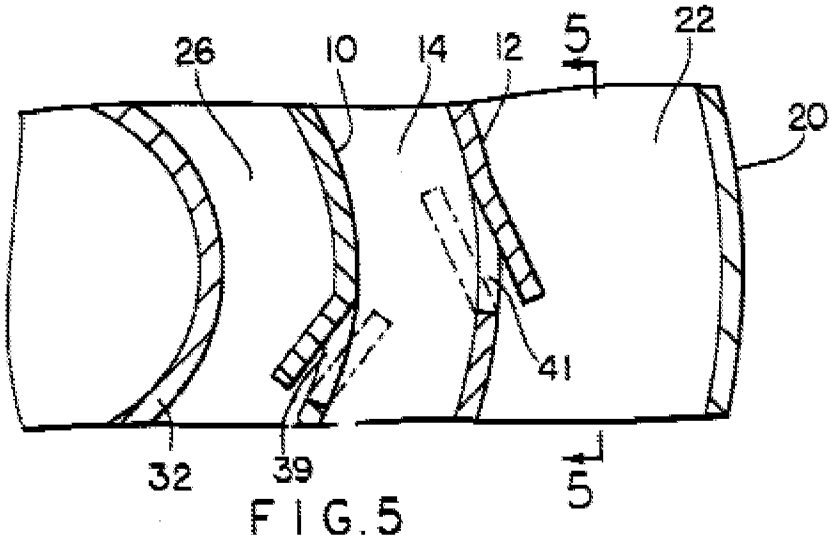


FIG.5

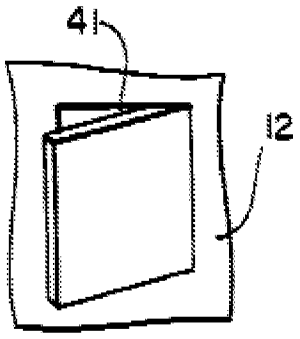


FIG.5A

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(3). **Claims 7, 13, 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (US 6019825A), evidenced by El-Saie (US 4498819).

As to in which fluid inlet slopes downward along the inner wall of the standing vessel in **claim 13**, it would be obvious to have fluid inlet downward because design choice as evidenced by El-Saie (US 4498819) inlet 15 in figure.

As to in which downward slope of fluid way increases in **claim 7**, Greene et al (US 6019825A) disclose the number of revolutions in the helix being also important factor in separation (col. 11, ln. 32-33) the number of revolutions required to achieve adequate separation

is dependent upon several variables such as difference in specific gravity between fluids to be separated, their viscosities, particle size and interfacial tension. In order to simplify, having a given particle size distribution in a known carrying fluid, the radial terminal velocity of the sphere can be estimated. The width of the channel and the average flow velocity being known, the minimum number of revolutions in the fully developed flow regime can be estimated. It is estimated that a standard design would have at least six revolutions (col. 12, ln. 6-17). Therefore, in absence of showing criticality of the records, it would be obvious to have fluid way downward slope increase in order to optimize the fluid throughput and separation efficiency.

As to a scrubber for separating constituents including a liquid phase from a substantially gaseous fluid flow comprising: a standing vessel having a substantially round cross section, an inner wall, a lower liquid outlet and an upper gas outlet; a fluid inlet directing fluid introduced into the standing vessel along the inner wall; and a fluid way that is arranged as a downward directed spiral along the inner wall of the standing vessel that extends from the vicinity of the fluid inlet to the vicinity of the liquid outlet and that has an opening allowing gas to escape inward to a central region of the standing vessel such that all fluid introduced into the fluid way is passed down the full length of the fluid way except the escaped gas, wherein the fluid inlet slopes downward along the inner wall of the standing vessel in **independent claim 19**, the disclosure of Baker et al, El-Saie is incorporated herein by reference, the most subject matters as currently claimed, have been recited in Applicants' claims 7,11 and have been discussed therein.

(4). **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (US 6019825A) in view of Borsheim (US 3792573) for the same rationale recited in prior Office Action dated 5/19/2010.

(5). **Claims 5-6, 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (US 6019825A).

As to standing vessel being shaped as a truncated cone and fluid way being in form of a longitudinal, spiral-wound open pipe adapted to shape of the standing vessel in **claim 5**, Greene et al (US 6019825A) disclose, with reference to fig. 6-9, a further embodiment of apparatus comprises a structural helical path defining means consisting of a helical dividing means situated

within the annular space, bridging the width between inner shell and outer shell and defining the helical path between successive turns of the helical means 16, as illustrated in figure below; pipe 42, hole 50, annular space 14.

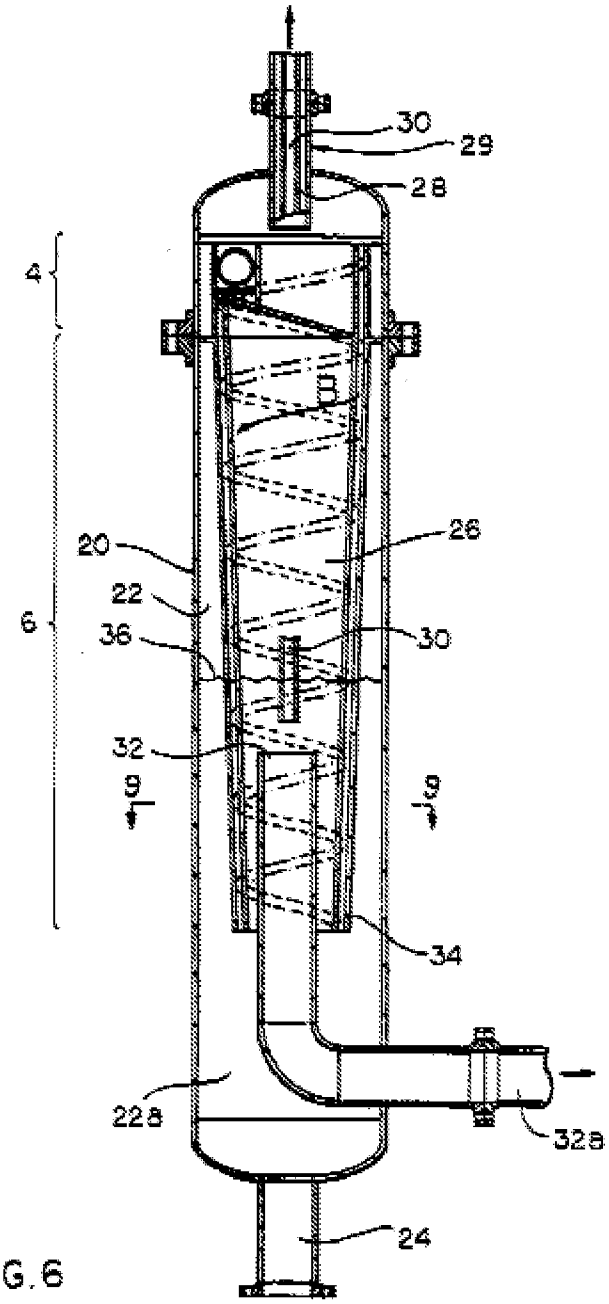


FIG.6

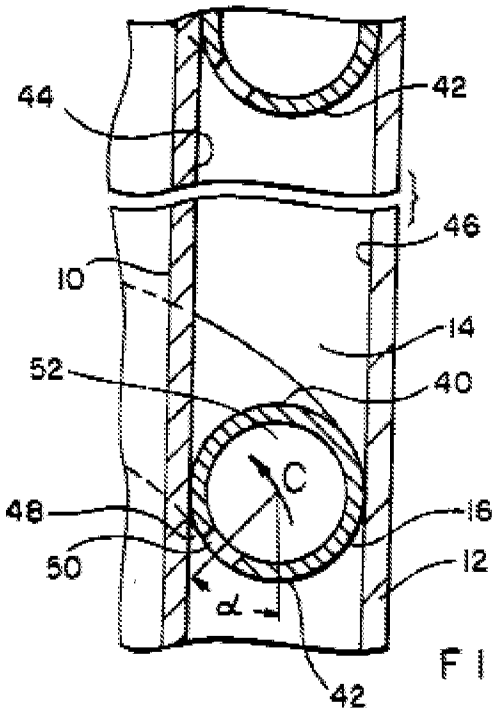


FIG.8

It would be obvious to have truncated cone shape because change in shapes does not affect functions. *In re Dailey 357 F.2d 669, 149 USPQ 47 (CCPA 1966).*

As to vortex breaker being arranged above the upper gas outlet of the standing vessel in **claim 6**, Greene et al (US 6019825) disclose, in addition, it is possible that 2nd gas/liquid separator arrangement may be used with hydrocyclones. Gas with entrained liquid flows from cyclone 2 up through column 28, which acts as an inlet to the gas/liquid separator 60, as shown in Figures 10-12 (Col. 6, line 29-34). A mixed gas/liquid stream enters through uptake 28 and flows into space 78 in upward orientation (Col. 6, line 54-55). Greene et al **do not teach** the vortex breaker being arranged above the upper gas outlet of the hydrocyclone as claimed.

However, it would be obvious to install the vortex breaker above the gas outlet of hydrocyclone disclosed by Greene et al because it would eliminate the radial flow and become more upward as well known in the art, therefore to reduce the pressure drop in the uptake pipe.

As to fluid way to be completely closed for gas escape at fluid inlet, but becoming gradually open for escape of gas towards the liquid outlet, and fluid way having about 5 revolutions in the total in **claim 10**, in the absence of showing criticality of the records, it would be obvious to have closed fluid way at beginning section and becoming gradually open for

escape of gas toward liquid outlet because the dynamic separation based on rotation becomes more effective along the spiral fluid way. The optimized revolutions of fluid way to be about 5 turns in such know process render prima facie obvious within one of ordinary skills in the art. *In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).*

(5). **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (US 6019825A) in view of Newton (US 3997303) for the same rationale recited in prior Office Action dated 5/19/2010.

ALTERNATIVELY, CLAIMS 2-19 ARE REJECTED IN THE FOLLOWING:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(6). **Claim 11** is rejected under 35 U.S.C. 102(b) as being anticipated by Baker et al (US 5632962A).

As to a scrubber for separating constituents including a liquid phase from a substantially gaseous fluid flow comprising a standing vessel having a substantially round cross section, an inner wall, a lower liquid outlet and an upper gas outlet; a fluid inlet directing fluid introduced into the standing vessel along the inner wall in which the fluid way is shaped as a guiding plate that spirals downward on the inner wall of the standing vessel; a fluid way that is arranged as a downward directed spiral along the inner wall of the standing vessel that extends from the vicinity of the fluid inlet to the vicinity of liquid outlet and that has an opening allowing gas to escape inward to a central region of the standing vessel such that all fluid introduced into the fluid way is passed down the full length of the fluid way except the escaped gas in **independent claim 11**, Baker et al (US 5632962A) disclose Process Vessel (Title).The process vessel has a peripheral wall disposed around a longitudinal axis, an inlet for permitting entry of fluid into the vessel and an outlet for permitting the exit of fluid from the vessel (Abstract, ln. 3-6). Typically, the fluid or fluids flowing through the process vessel comprise a liquid or a gas or combination

thereof (col. 4, ln. 35-36). The vessel includes a re-distributor which follows a locus which is not perpendicular or parallel to the longitudinal axis (col. 2, ln. 46-48). For vessels which are symmetrical about the longitudinal axis, such **as right cylindrical** and **frusto-conical vessels**, the element may extend along a generally helical path (col. 3, ln. 13-16). Preferably, the element extends around the vertical axis within the process vessel and generally follows the internal contours of peripheral wall of vessel (col. 3, ln. 1-3). Preferably, the element is suitable for co-current and **counter-current** operations whereas in a counter-current operation a 1st and 2nd fluid flow in generally opposite direction (col. 4, ln. 1-6). It is illustrated in figure 12 below: a fifth embodiment of process vessel and re-distributor 110 is shown in figure 12 with the process vessel 112 being in the form of a cylindrical vessel and having a re-distributor 113 which follows a **helical locus**. At top end of the process vessel 112 is an **inlet tube 114** to allow passage of a fluid such as a liquid or **vapor/liquid mixture** into the vessel. The re-distributor 113 is in the form of a **helical plate 116** having a weir 118 fixed to the upper face and outer edge of the plate 116 opposite to the edge fixed to the inside face 120 of the vessel wall 122. Distributed along the length of the helical plate 116 and weir 118 are **holes 124** (col. 9, ln. 40-51).

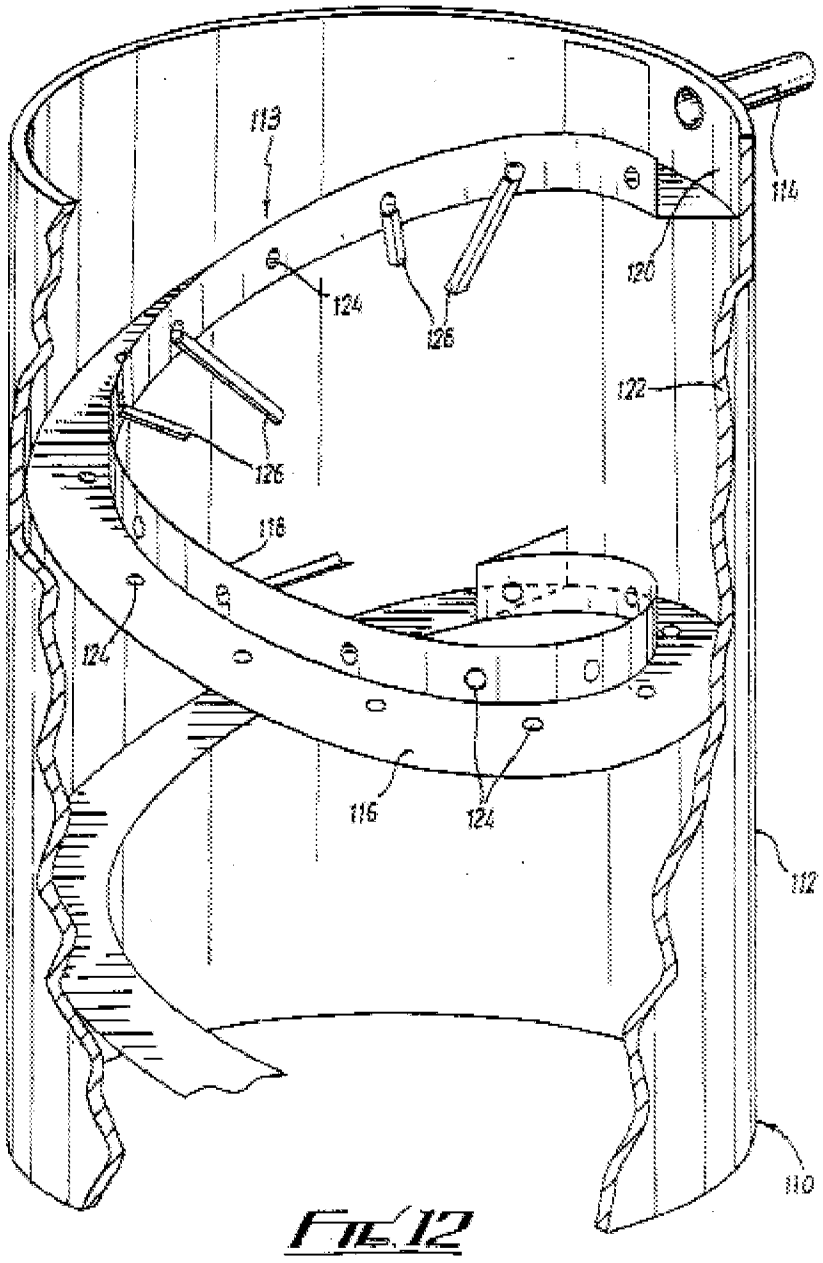


FIG. 12

The intended use "for separating constituents including a liquid phase from a substantially gaseous fluid flow" and "allowing gas to escape inward to a central region of the standing Vessel" is not considered as limitation of claim because the re-distributor of prior art Baker et al (US 5632962) is substantially identical to the Applicants' scrubber. It will be useful for the Applicants' scrubber as well.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

(7). **Claims 2, 17, 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al (US 5632962A), evidenced by El-Asie (US 4498819).

As to a scrubber for separating constituents including a liquid phase from a substantially gaseous fluid flow comprising a standing vessel having a substantially round cross section, an inner wall, a lower liquid outlet and an upper gas outlet; a fluid inlet directing fluid introduced into the standing vessel along the inner wall in which the fluid way is shaped as a guiding plate that spirals downward on the inner wall of the standing vessel; a fluid way that is arranged as a downward directed spiral along the inner wall of the standing vessel that extends from the vicinity of the fluid inlet to the vicinity of liquid outlet and that has an opening allowing gas to escape inward to a central region of the standing vessel such that all fluid introduced into the fluid way is passed down the full length of the fluid way except the escaped gas in **independent claim 17,** the disclosure of Baker et al is incorporated herein by reference, the most subject matters as currently claimed, have been recited in Applicants' claim 11 and have been discussed therein.

As to the fluid way being shaped as a guiding plate that spiral downward on the inner wall of the standing vessel and the guiding plate extending toward a central axis of the standing vessel and has a width in a range of 5% to 20% of an inner diameter of the standing vessel and along the innermost portion of the guiding plate that is the portion closest to the central axis of the standing vessel has an upwards extending edge of a height in a range of 75-150% of the width of the guiding plate in **claims 2** and **17**, as shown in figure 12 of Baker et al above, it shows the guiding plate and weir. Baker et al (US 5632962A) **do not teach** the dimension of guiding plate and upward extending edge as claimed.

However, in absence of showing criticality of the records, the optimized dimension for guiding plate having width in range of 5% to 20% of an inner diameter of standing vessel,

upward edge of a height in a range of 75-150% of width of guiding plate renders obvious in order to maximize the performance of vessel within one of ordinary skills in the art. "where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show the chosen dimension are critical", *In re Woodruff 16 USPQ 2d 1934 (Fed. Cir. 1990).*

As to a scrubber for separating constituents including a liquid phase from a substantially gaseous fluid flow comprising: a standing vessel having a substantially round cross section, an inner wall, a lower liquid outlet and an upper gas outlet; a fluid inlet directing fluid introduced into the standing vessel along the inner wall; and a fluid way that is arranged as a downward directed spiral along the inner wall of the standing vessel that extends from the vicinity of the fluid inlet to the vicinity of the liquid outlet and that has an opening allowing gas to escape inward to a central region of the standing vessel such that all fluid introduced into the fluid way is passed down the full length of the fluid way except the escaped gas in **independent claim 19**, the disclosure of Baker et al is incorporated herein by reference, the most subject matters as currently claimed, have been recited in Applicants' claim 11 and have been discussed therein. As to wherein the fluid inlet slopes downward along the inner wall of the standing vessel in **independent claim 19**, it would be obvious to have the fluid inlet downward because design choice, as evidenced by El-Saie (US 4498819) inlet 15 in figure.

(8). **Claims 12-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al (US 5632962A) in view of Robinson (US 3507397), El-Saie (US 4498819).

As to in which fluid inlet is oriented so as to be tangential to inner wall of the standing vessel in **claim 12**, Baker et al **do not teach** inlet to be tangential as claimed.

However, Robinson (US 3507397) **teaches** hydrocyclone unit (Title). An inlet is in tangential direction with respect to envelope surface of the cone (col. 1, ln. 51-53).

The advantage of tangential inlet is to generate rapid swirling motion (col. 1, ln. 55).

Therefore, it would have been obvious at time of the invention to have fluid inlet to be tangential disclosed by Robinson for the vessel of Baker in order to achieve the advantage described previously.

As to in which the fluid inlet slopes downward along the inner wall of the standing vessel in **claim 13**, it would be obvious to have the inlet downward because design choice as evidenced by El-Saie (US 4498819) inlet pipe 15 in figure.

Allowable Subject Matter

(9). **Claim 18** is allowed.

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The limitation "guiding plate from the top of the scrubber from an upper level slightly above an inlet centered on the deflection plate to a lower level slightly above the liquid phase located in the bottom of the standing vessel" cited in claims 3 and 18 overcomes prior arts of the record.

Claims 4, 8, 15-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The limitation "spiral-shaped pipe is oriented in direct elongation from a tangential inlet, extends to just above the liquid outlet and has at least one opening for gas escape" cited in claim 4 is not disclosed by prior arts of the record.

The limitation "in which the fluid way has a downwardly increasing opening for gas escape" cited in claim 8 is not disclosed by prior arts of the record.

Response to Arguments

(10). Applicant's arguments, see page 9, Remarks, filed 8/17/2010, with respect to the rejection(s) of claim(s) 11 - limitation of "an opening allowing gas to escape inward to a central region of the standing vessel" under 102 rejection in view of figure 6 of Green et al (US 6019825A) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Greene et al (US 6019825A) in fig. 2, 5 & 5A.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu
Art Unit: 1797
Date: September 13, 2010

/Duane Smith/
Supervisory Patent Examiner, Art Unit 1797